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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/714,316	11/16/2000	Thomas R. Justen	US-1483	6478

7590

04/05/2002

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EXAMINER

VASUDEVA, AJAY

ART UNIT

PAPER NUMBER

3617

DATE MAILED: 04/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/714,316

Applicant(s)
Justen et al.

Examiner
Ajay Vasudeva

Art Unit
3617



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 18 Jan 2002

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-12 and 14-29 is/are rejected.

7) ☒ Claim(s) 13 and 30 is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____.
- ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☐ Notice of References Cited (PTO-892)

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

19) ☐ Notice of Informal Patent Application (PTO-152)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

20) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 60-022021.

JP 60-022021 shows an air intake silencer for an internal combustion engine, generally as claimed, having a straight inlet pipe [13] with an inlet passage, and a tuning tube [19] with a tuning passage in fluid communication with the inlet passage.

3. Claims 1-3, and 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 03-229908.

JP 03-229908 shows an air intake silencer for an internal combustion engine (figure 11), generally as claimed, having a straight inlet pipe [6] with an inlet passage, a first tuning tube [3]

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with a tuning passage in fluid communication with the inlet passage, and a second tuning tube [1] in a wrap-around relationship with the first tuning tube.

4. Claims 1, 2, and 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 05-163925.

JP 05-163925 shows an air intake silencer for an internal combustion engine (figure 4), generally as claimed, having a straight inlet pipe [1] with an inlet passage, a first tuning tube [4] with a tuning passage in fluid communication with the inlet passage, and a second tuning tube [2] in a wrap-around relationship with the first tuning tube.

5. Claims 1, 3, 5, 7-11, 14-16, 18, 21-23, 25, and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakayasu et al.

Nakayasu et al. shows an air intake silencer for an outboard motor (figure 2), generally as claimed, having lower and upper covers [52, 18], an air intake silencer [55] attached to the cover, an inlet pipe [66] with an inlet passage, and a tuning tube [65] with a tuning passage in fluid communication with the inlet passage. The air intake silencer is in attachment with the top as well as the side walls of the covers. The inlet pipe comprise an air intake manifold. The intake tube and the tuning tube have substantially equal diameters.

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Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-5, 7, 8-12, 15-18, 20-25, 27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mondek ('847) in view of JP 60-022021.

Mondek discloses an outboard motor with an internal combustion engine, having air inlet pipe connected to a cover for the motor at a top wall of the cover (figure 6), a bottom wall (figure 5), or side wall (figure 11) for supplying air.

Mondek is silent on a provision of a silencing device for the internal combustion engine.

JP 60-022021 shows an air intake silencer for an internal combustion engine having a tuning tube attached to the inlet tube, as described above.

It would have been obvious for one skilled in the art at the time of the invention to attach a tuning tube to the inlet tube of Mondek, as taught by JP 60-022021. Integrating a tuning tube to

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the inlet tube would provide the benefits of lowering the ambient noise level of the engine, which will reduce the noise pollution and make the watercraft operation more enjoyable to the operator.

Regarding claims 20 and 27, it would have been obvious for one skilled in the art to manufacture the inlet tube integrally with the tuning tube as one unit. Making both tubes integral as a single unit would reduce the number of components, thus reducing assembly time and labor.

8. Claims 1-3, 5-12, 15, 16, 18-23, 25-27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mondek ('847) in view of JP 03-229908.

Mondek discloses an outboard motor with an internal combustion engine and an air inlet pipe, as above.

Mondek is silent on a provision of a silencing device the internal combustion engine.

JP 03-229908 shows an air intake silencer for an internal combustion engine having a first tuning tube, and a second tuning tube in a wrap-around relationship with the first tuning tube, as described above.

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It would have been obvious for one skilled in the art at the time of the invention to attach a tuning tube to the inlet tube of Mondek, as taught by JP 03-229908. Integrating a tuning tube to the inlet tube would be beneficial for the reason described in tem # 8 of this office action.

Regarding claims 20 and 27, it would have been obvious for one skilled in the art to manufacture the inlet tube integrally with the tuning tube as one unit. Making both tubes integral as a single unit would reduce the number of components, thus reducing assembly time and labor.

Allowable Subject Matter

9. Claims 13 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments filed 1/18/2002 have been fully considered but they are not persuasive.

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11. A basic premise of applicant's arguments, as understood by the examiner, is that all rejection of the previous Office Action are improper because the references cited by the examiner are, unlike applicant's own invention, resonator silencing devices. The applicant has argued examiner's rejections on the basis that *the noise attenuation systems shown in the prior art references are dependent ... upon the enclosed space, or volume, of the resonant chambers rather than a path length between the air intake (emphasis added) and the resonant chamber* (page 6, line 20-22).

The examiner believes that the applicant's arguments are flawed on several accounts, as described below.

First, by arguing that the prior art references are merely resonator type silencing devices, it is implied that the applicant's own invention, namely the silencer, works on a principle different from the resonance effect. The examiner considers this argument as being in error. Each individual tuning tube of applicant's invention, in fact, accomplishes noise attenuation based on the same principle of resonance effect, as seen in the cited art. It is however acknowledged that is the combination of two or more tuning tubes which further imparts a different kind of acoustic attenuation characteristics to the invention.

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Second, the applicant states, as above, that the noise attenuation systems shown in all prior art references are dependent ... upon ... resonant chambers rather than a path length between the air intake [of the tuning tube] and the resonant chamber (page 6, line 20-22). The applicant does not specify what such air intake is, and the examiner assumes that it is the air intake of the tuning tube that is being referred to. However, examiner has not suggested a presence of any air intake associated with the tuning tube. It may be noted that the resonator devices cited by the examiner do not actually receive the induction air flow through the tuning tubes, as implied by the underlined part of the sentence above, but are merely in communication with the main induction tube such that only sound waves travel through such tuning tubes.

Third, and most importantly, applicant argues that the prior art references are dependent ... upon the enclosed space, or volume, of the resonant chambers rather than a path length [of the tuning tube] and the resonant chamber. It is pointed out that the prior art references accomplish silencing based on a resonance effect, which is dependent on the path length of the tuning tube – or the tuning neck –, albeit *not exclusively dependent on the path length of the tuning tube alone* in many of the resonators.

The examiner feels it is important for the applicant to note a general description of the resonator type silencing devices, as follows, in order to understand the examiner's stand.

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Conventional resonator type silencers for the internal combustion engines are arranged to attenuate engine-generated noise at a predetermined frequency, or a predetermined frequency range, under a resonance effect. Use of such devices – such as with the intake manifolds of internal combustion engines – minimize or counteract the effects of standing waves and other acoustic phenomena generated in the air induction system. These resonator devices do not actually receive the induction air flow, but is in fluid communication with the flow path via a small opening in the main induction tube attached to the engine. The process of sizing such resonators for being resonant at a certain predetermined and desired range of sound frequencies is called “tuning” of the resonator, and is dependent on one or several dimensional characteristics of the resonator components.

Some of the common type of resonator devices are:

- (I) the “Side branched type” resonator silencers,
- (II) the Helmholtz resonator type silencers, and
- (III) Coaxial type resonator silencers.

(I) The Side branched type resonator silencer is simply a tube device – also called the tuning tube – that is attached over an orifice of the induction tube. These resonator silencers are effective in a very narrow range of noise frequencies only, which is determined by the length of the tube alone. Specifically, the resonant frequency is a

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function of, and is inversely proportional to, the length and cross sectional area of the tuning tube.

$$\text{Resonance Frequency } F_r = (C/4L)$$

where C = Speed of sound; L = Length of the tuning tube;

(II) The Helmholtz resonator is a modification of the Side-branch type resonator, which employs a resonant chamber of a larger volume attached to the far end of the tuning tube. This modification increase the resonator effectiveness by increasing the resonant frequency range that is broader than the range provided the Side-branch type resonator. The effective sound frequencies are determined not only by the length and the cross section of the tuning tube, but also by the volume of the resonant chamber. Specifically, the resonant frequency is a function of, and is proportional to the cross-sectional area of the tuning tube, and inversely proportional to the length of the tuning tube as well as the volume of resonant chamber.

$$\text{Resonance Frequency } F_r = (C/2\pi) * (S/LV)^{1/2}$$

where S = Cross-sectional area of the tuning tube; L = Length of the tuning tube;

V = Volume of resonance chamber

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(III) The Coaxial type resonator silencer is a silencer in which a resonance cylinder is disposed coaxially over the tuning tube and in communication with an induction tube through the opening of the tuning tube. The resonant frequency is

$$\text{Resonance Frequency } F_r = (C/2\pi) * (nS/LV)^{1/2}$$

where S = Cross-sectional area of the tuning tube; L = Length of the tuning tube;

V = Volume of resonance chamber

It is apparent from the above equations that the resonance frequency in each type of resonator silencer can be varied by altering the length of the tuning tube alone.

Although the examiner acknowledges that the resonant frequency of the Helmholtz- and the Coaxial-type resonator silencers is not exclusively a function of the length of passage alone, it is however noted that the length of passage is one of the factors that determine the resonant frequency. In the case of the Helmholtz- and Coaxial type resonator silencers, the resonance frequency can be determined by altering either or both the length of the tuning tube and the volume of the resonance chamber. In the case of the “Side branched type” resonator, the length of the tuning tube alone determines the resonance frequency.

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The applicant further argues that the resonance frequency in the applicant's invention is determined by the length of the tuning tube alone. However, such distinction is not reflected in the language of the claims, and the claims fail to incorporate the limitation "length of passage of the tuning tube" as being the sole criterion that determines the resonant frequency.

Since the basic premise of applicant's argument for each of the rejections appears to be in error, the examiner feels that a consolidated response such as above addresses all aspects of applicant's arguments. The following may be further noted.

(A) Rejection of claims 1-5, 7 and 8 under 35 U.S.C. § 102(b) as being anticipated by JP 60-022021: *Refer to the above consolidated response.*

(B) Rejection of claims 1-3, and 5-8 under 35 U.S.C. § 102(b) as being anticipated by JP 03-229908: *Refer to the above consolidated response.*

(C) Rejection of claims 1, 2 and 5-8 under 35 U.S.C. § 102(b) as being anticipated by JP 05-163925: *Refer to the above consolidated response.*

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(D) Rejection of claims 1, 3, 5, 7-11, 14-16, 18, 21-23, 25, and 27-29 under 35 U.S.C. § 102(b) as being anticipated by Nakayasu et al.: *Refer to the above consolidated response.*

Additionally, applicant argues that the engine noise in Nakayasu reference is attenuated in the expansion chamber before it enters the intake duct (page 12, line 20), and that the expansion chamber is positioned in the transom of the boat (page 13, line 14).

Although the expansion chamber of Nakayasu provides a certain degree of noise attenuation, the examiner would like to point out that the sound is further attenuated by the presence of the tuning tube [65]. That the expansion chamber is positioned in the transom of the boat is not important because no distinction in this regard has been made in the claims. Because the tuning tube is in fluid communication with the induction tube, even if not directly attached to it, the rejection stands.

(E) Rejection of claims 1-5, 8-18, 21-25, and 28-30 under 35 U.S.C. § 102(b) as being anticipated by Kiekhaefer is withdrawn.

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(F) Rejection of claims 1-5, 7-12, 15-18, 20, 21-23, 24, 25, 27 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Mondek in view of JP 60-022021: *Refer to the above consolidated response.*

(G) Rejection of claims 1-3, 5-12, 15, 16, 18-23, 25, 27 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Mondek in view of JP 03-229908: *Refer to the above consolidated response.*

Conclusion


12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ajay Vasudeva whose telephone number is (703) 306-5992.



S. JOSEPH MORANO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600



AV

April 4, 2002